

IN THE CLAIMS:

- 1 1. (Currently Amended) A method for a coordinated bringup of a repaired storage
2 appliance in a storage appliance cluster, the repaired storage appliance having a disk sub-
3 system, ~~the method comprising the steps of:~~
4 asserting a first state in memory of the repaired storage appliance, the first state
5 indicating that the repaired storage appliance awaits release of disk reservations of the
6 disk subsystem by a surviving storage appliance;
7 releasing the disk reservations in response to detection of the asserted first state
8 by the surviving storage appliance;
9 initializing the disk subsystem of the repaired storage appliance;
10 asserting a second state in memory of the repaired storage appliance, the second
11 state indicating that the repaired storage appliance has initialized the disk subsystem; and
12 performing a giveback operation by the surviving storage appliance in response to
13 detecting the second state.
- 1 2. (Currently Amended) The method of claim 1 further comprising ~~the steps of:~~
2 completing the repaired storage appliance initialization; and
3 processing data access requests by the repaired storage appliance.
- 1 3. (Cancelled)
- 1 4. (Previously Presented) The method of claim 1 wherein the surviving storage ap-
2 pliance detects the first state by performing a remote direct memory access read operation
3 to the memory.

- 1 5. (Previously Presented) The method of claim 1 wherein the surviving storage ap-
2 pliance detects the second state by performing a remote direct memory access operation
3 of the memory.
- 1 6. (Original) The method of claim 1 wherein the surviving storage appliance ceases
2 to process data access requests directed to the repaired storage appliance after performing
3 the giveback operation.
- 1 7. (Currently Amended) A storage appliance for use in a storage system cluster, the
2 storage appliance comprising:
3 a storage operating system having a cluster failover layer adapted to perform a
4 coordinated bringup operation in association with a partner storage appliance, wherein
5 the coordinated bringup operation comprises the steps of:
6 (i) asserting a first state in memory of the storage appliance;
7 (ii) initializing a disk subsystem of the repaired storage appliance in re-
8 sponse to detecting a release of disk reservations by a partner storage appliance;
9 (iii) asserting a second state in memory of the storage appliance;
10 (iv) processing data access requests directed to the storage appliance after
11 a giveback operation performed by the partner storage appliance; and
12 whereby a period of time during which clients of the storage system are without
13 connectivity is minimized.
- 1 8. (Previously Presented) The storage appliance of claim 7 wherein the cluster
2 failover layer is further adapted to perform routine remote direct memory access read op-
3 erations to the partner storage appliance to detect a state of the partner storage appliance.
- 1 9. (Previously Presented) The storage appliance of claim 8 wherein the second state
2 comprises an indication that the storage appliance has initialized its disk subsystem.

1 10. (Previously Presented) The storage appliance of claim 8 wherein the first state
2 comprises an indication that the storage appliance awaits release of disk reservations by
3 the partner storage appliance.

1 11. (Currently Amended) A method for a coordinated bringup of a repaired storage
2 appliance in a storage appliance cluster, the repaired storage appliance having a disk sub-
3 system, ~~the method comprising the steps of:~~
4 asserting a first state in memory of the repaired storage appliance;
5 releasing disk reservations in response to detection of the asserted first state by a
6 surviving storage appliance;
7 initializing the disk subsystem of the repaired storage appliance;
8 asserting a second state in memory of the repaired storage appliance; and
9 performing a giveback operation by the surviving storage appliance in response to
10 detecting the second state.

1 12. (Cancelled)

1 13. (Original) The method of claim 11 wherein the surviving storage appliance de-
2 tects the first state by performing a remote direct memory access read operation to the
3 predetermined memory location.

1 14. (Original) The method of claim 11 wherein the surviving storage appliance de-
2 tects the second state by performing a remote direct memory access operation of the pre-
3 determined memory location.

1 15. (Original) The method of claim 11 wherein the surviving storage appliance
2 ceases to process data access requests directed to the repaired storage appliance after per-
3 forming the giveback operation.

1 16. (Previously Presented) The method of claim 11 wherein the first state comprises
2 an indication that the repaired storage appliance awaits release of disk reservations by the
3 surviving storage appliance.

1 17. (Previously Presented) The method of claim 11 wherein the second state com-
2 prises an indication that the repaired storage appliance has initialized its disk subsystem.
3

1 18. (Original) The method of claim 11 wherein the set of disk reservations com-
2 prises small computer systems interface reservations.

1 19. (Previously Presented) A computer readable medium, including program instruc-
2 tions executing on a storage appliance, for a coordinated bringup of a repaired storage
3 appliance in a storage appliance cluster, the repaired storage appliance having a disk sub-
4 system, the computer readable medium including instructions for performing the steps of:
5 asserting a first state in memory of the repaired storage appliance, the first state
6 indicating that the repaired storage appliance awaits release of disk reservations by a sur-
7 viving storage appliance;
8 releasing disk reservations in response to detection of the asserted first state by a
9 surviving storage appliance;
10 initializing the disk subsystem of the repaired storage appliance;
11 asserting a second state in memory of the repaired storage appliance, the second
12 state indicating that the repaired storage appliance has initialized its disk subsystem; and
13 performing a giveback operation by the surviving storage appliance in response to
14 detecting the second state.

1 20. (Original) The computer readable medium of claim 19 further comprising the
2 steps of:

3 completing the repaired storage appliance initialization; and
4 processing data access requests by the repaired storage appliance.

1 21. (Cancelled)

1 22. (Previously Presented) The computer readable medium of claim 19 wherein the
2 surviving storage appliance detects the first state by performing a remote direct memory
3 access read operation to the memory of the repaired storage appliance.

1 23. (Previously Presented) The computer readable medium of claim 19 wherein the
2 surviving storage appliance detects the second state by performing a remote direct mem-
3 ory access operation of the memory of the repaired storage appliance.

1 24. (Currently Amended) A method for a coordinated bringup of a repaired storage
2 appliance in a storage appliance cluster, ~~the method comprising the steps of:~~
3 asserting a first state indicating that the repaired storage appliance awaits release,
4 by a surviving storage appliance, of disk reservations for a disk subsystem of the repaired
5 storage appliance;
6 releasing the disk reservations in response to detection of the asserted first state
7 by the surviving storage appliance;
8 initializing the disk subsystem of the repaired storage appliance in response to re-
9 leasing the disk reservations by the surviving storage appliance;
10 asserting a second state indicating that the repaired storage appliance has initial-
11 ized the disk subsystem; and
12 performing a giveback operation by the surviving storage appliance in response to
13 detecting the second state.

1 25. (Previously Presented) The method of claim 24, wherein the first state and sec-
2 ond state are stored in a state data structure in memory of the repaired storage appliance.

1 26. (Previously Presented) The method of claim 25 wherein the surviving storage
2 appliance detects the first state by performing a remote direct memory access read opera-
3 tion to the state data structure.

1 27. (Previously Presented) The method of claim 25 wherein the surviving storage
2 appliance detects the second state by performing a remote direct memory access opera-
3 tion to the state data structure.

1 28. (Currently Amended) A storage appliance for use in a storage system cluster, the
2 storage appliance comprising:

3 a storage operating system having a cluster failover layer adapted to perform a
4 coordinated bringup operation in association with a partner storage appliance, wherein
5 the coordinated bringup operation comprises ~~the steps of~~:
6 asserting a first state indicating that the repaired storage appliance awaits release,
7 by a surviving storage appliance, of disk reservations for a disk subsystem of the repaired
8 storage appliance;

9 releasing the disk reservations in response to detection of the asserted first state
10 by the surviving storage appliance;

11 initializing the disk subsystem of the repaired storage appliance in response to re-
12 leasing the disk reservations by the surviving storage appliance;

13 asserting a second state indicating that the repaired storage appliance has initial-
14 ized the disk subsystem; and

15 performing a giveback operation by the surviving storage appliance in response to
16 detecting the second state.

1 29. (Previously Presented) The storage appliance of claim 28, wherein the first state
2 and second state are stored in a state data structure in memory of the repaired storage ap-
3pliance.

1 30. (Previously Presented) The storage appliance of claim 29 wherein the surviving
2 storage appliance detects the first state by performing a remote direct memory access
3 read operation to the state data structure.

1 31. (Previously Presented) The storage appliance of claim 29 wherein the surviving
2 storage appliance detects the second state by performing a remote direct memory access
3 operation to the state data structure.

1 32. (Previously Presented) A computer readable medium, including program instruc-
2 tions executing on a storage appliance, for a coordinated bringup of a repaired storage
3 appliance in a storage appliance cluster, the computer readable medium including instruc-
4 tions for performing the steps of:

5 asserting a first state indicating that the repaired storage appliance awaits release,
6 by a surviving storage appliance, of disk reservations for a disk subsystem of the repaired
7 storage appliance;

8 releasing the disk reservations in response to detection of the asserted first state
9 by the surviving storage appliance;

10 initializing the disk subsystem of the repaired storage appliance in response to re-
11 leasing the disk reservations by the surviving storage appliance;

12 asserting a second state indicating that the repaired storage appliance has initial-
13 ized the disk subsystem; and

14 performing a giveback operation by the surviving storage appliance in response to
15 detecting the second state.

1 33. (Previously Presented) The computer readable medium of claim 32, wherein the
2 first state and second state are stored in a state data structure in memory of the repaired
3 storage appliance.

1 34. (Previously Presented) The method of claim 33 wherein the surviving storage
2 appliance detects the first state by performing a remote direct memory access read opera-
3 tion to the state data structure.

1 35. (Previously Presented) The method of claim 33 wherein the surviving storage
2 appliance detects the second state by performing a remote direct memory access opera-
3 tion to the state data structure.